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The genus *Aconitum* in Pakistan and adjacent territories

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A b s t r a c t : 11 species and 7 varieties of *Aconitum* occurring in Pakistan and adjacent areas are keyed out and described in detail with critical annotations as a correction of the account in "Flora of Pakistan".

A recent treatment of Ranunculaceae has been published in "Flora of Pakistan" under my name and that of Dr. Yasin Nasir (RIEDL & NASIR 1991). When I had sent my completed manuscript to Dr. Nasir several years ago I had had no idea that parts of it would be changed and he himself mentioned as co-author. I did not see it again and did not receive any proofs, so that I could not influence its final version. At least in two genera, *Aconitum* and *Anemone*, the changes affected essentially my own concept and included major mistakes, which shall be corrected for *Aconitum* in the present paper consisting of the original text augmented by a few remarks on the "Flora of Pakistan"-version. A few species not yet found in present Pakistan but in closely adjacent territories also have been treated such as *A. deinorrhizum*. For *Anemone*, some additional research seems to be necessary, and a publication of the results will follow at a later date.

Aconitum LINNAEUS

Perennial or biennial herbs, often with stout leafy stems, bulbs or creeping rhizomes. Leaves mostly cauline, palmatisect or lobed, rarely undivided and dentate. Flowers in simple or branched racemes, rarely 1-2, zygomorphic. Pedicels with 2 bracteoles. Sepals 5, petaloid, the upper one shaped like a helmet, the 2 lateral ones wider than the basal pair. Petals 2,

with a long stipe and a small hooded limb, nectariferous. Staminodes 3-8, stamens numerous. Carpels 3-7, free, with numerous ovules. Follicles with triquetrous, rarely oblong, winged or costate seeds.

Most of the species are poisonous, but some are used as medicinal plants, for instance, *A. heterophyllum* WALL. for dysentery and similar diseases.

The genus comprises about 300 species, which are widely distributed in the northern temperate zone and mountaneous regions of the subtropics. Four sections are distinguished by SHTEINBERG (1937), three of them are also represented in Pakistan.

1. Helmet cylindrical or cylindric-conical, distinctly longer than wide, or as long as wide at the base. Sepals yellowish, rarely bluish or reddish. Rootstock elongate breaking up with numerous fibers Sect. *Lycotomonum*
- Helmet usually markedly wider than long. Sepals blue, bluish-violet or pale violet, rarely greenish to yellowish with purple veins. Rootstock composed of 2 or more bulbs.
2. Rootstock composed of 2 divergent bulbs. Plants biennial Sect. *Aconitum*
- Rootstock composed of several bulbs arranged in an unbranched chain. Plants perennial Sect. *Catenata*

Key to species

1. Helmet of flowers longer than wide or about as long as the suddenly widened base 2
- Helmet wider than long, base not suddenly widened. 3
2. Inflorescence much branched, panicle-like 1. *A. laeve*
- Inflorescence simple or with one lateral branch. 2. *A. moschatum*
3. All or most of the leaves undivided, sometimes deeply lobed, cordate, with coarse teeth. 4
- All the leaves palmately-partite for more than half of their diameter, only the uppermost sometimes bract-like. 7

4. All the leaves undivided, primary teeth regularly bidentate (sometimes with the exception of those near the apex). Sepals dirty yellowish-green with purple veins.....4. *A. ovatum*
- The lower leaves usually deeply lobed, lobes dentate. Sepals (flowers) violet blue to violet. 5
5. Racemes loose, with only 2-5 flowers. Flowers glabrous apart from a few hairs at the base of the helmet. Bracts $\pm$ divided..... 5. *A. kashmiricum*
- Racemes often elongated, many-flowered. Flowers hairy..... 6
6. Bracts small, entire. 3a. *A. heterophyllum* var. *heterophyllum*
- Bracts longer dentate..... 3b. *A. heterophyllum* var. *bracteatum*
7. Carpels usually 3(-4)..... 8
- Carpels usually 5, rarely 4 or 6 10
8. Nectary hairy. Helmet with a short beak. Carpels pubescent, greyish..... 6. *A. deinorrhizum*
- Nectary glabrous. Helmet with a very long slender beak..... 9
9. Carpels glabrous 10. *A. soongoricum*
- Carpels with short, strongly curved hairs. 11. *A. curvipilum*
10. Carpels glabrous or nearly glabrous already in flower..... 11
- Carpels and fruits hairy 12
11. Pedicels up to 3,5 cm long. Sepals bluish or whitish with blue veins, with $\pm$ curved hairs. 8a. *A. chasmanthum* var. *chasmanthum*
- Pedicels up to 4,5 cm long. Sepals pale purplish, completely glabrous 8b. *A. chasmanthum* var. *swatense*
12. Leaves divided into very narrow, linear or rarely linear-lanceolate, pinnate lobes. If segment cuneate, lobes acute and diameter of leaves more than 6 cm..... 13
- Leaves divided into obovate or cuneate segments which in turn may be deeply incised, but not pinnately lobed. All the segments acuminate or nearly obtuse.....9. *A. rotundifolium*
13. Sepals violet or blue. Flowers numerous. 14

- Sepals yellowish with bluish veins. Flowers 3-4. 7c. *A. violaceum* var. *weileri*
- 14. Stem upto 30 cm high. Usually only 2 upper leaves present 7a. *A. violaceum* var. *violaceum*
- Stem 30-50 cm high. Upper leaves numerous. 7b. *A. violaceum* var. *robustum*

1. *Aconitum laeve* ROYLE, III. Bot. Himal. Mount. 1:56.1834; HOOK.f. & THOMS. in HOOK.f., Fl. Brit. Ind. 1:28.1867; in syn. under *A. Lycoctonum* LINN.; STAPF., Ann. Roy. Bot. Garden. Calcutta. 10(2): 136.1905; COVENTRY, Wild F. Kashm. 3:15.1930; STEWART, Ann. Vasc. Pl. W. Pak. & Kashm. 58.1972; LAUENER, Notes R.B.G. Edinb. 36(1):135.1978.

A. lycoctonum HOOK.f. & THOMS. in HOOK.f., Fl. Brit. Ind. 1: 28.1867, non LINN.

Root elongated, cylindrical. Stem erect, upto 1,5 m high, simple or with a few branches, in the upper part hairy and viscid, glabrous below. Basal leaves with very long petioles usually already dead and broken at flowering time; stem leaves gradually decreasing in size towards inflorescence, deeply 5-9-palmatisect with obovate to obovate-oblong segments, coarsely dentate or sometimes incised again, orbicular to orbicular-reniform in outline, upto 30 cm wide, glabrous, uppermost merging with floral leaves. Inflorescence composed of branched racemes, upto 50 cm, leafy, with a hairy axis. Bracteoles linear to filiform. Helmet from a wide base suddenly tapering to a cylindrical hood, straight or slightly recurved at apex, 12-16 mm high, 3-5 mm wide, yellowish. Petals (nectaries) erect, with a narrowly conical gibbulous straight or recurved hood, 5 mm long, with deflexed, oblong shortly bilobed lips. Filaments winged to the middle. Follicles 3, 10-13 mm, spreading, glabrous or with yellowish hairs. Seeds elliptical-oblong, compressed, shiny, finely transversely rugose, 2,5-3 mm long, Distribution from Chitral to Kashmir and Northern India. A very distinct species without any closer relationship in this region.

2. *A. moschatum* STAPF., Ann. Roy. Bot. Gard. Calcutta 10(2):139. 1905;
A. ferox WALL. var. *moschatum* BRUHL, Rec. Bot. Surv. India 1(3):23. 1894 nomen, Ann. Roy. Bot. Gard. Calcutta 5(2):109.1896, descr.

Root elongate, cylindrical. Stem upto 90 cm high, unbranched, arising from a simple or several-headed collar covered by remains of old leaves, glabrous below with soft spreading hairs above. Basal leaves upto 5, with long petioles; stem-leaves 1-3, similar but with a much shorter petiole. Leaves 5-palmate divided to the middle or $\frac{2}{3}$ of the length; segments 2-4 lobed, lobes crenate, with obtuse, apiculate teeth, with a deep basal sinus, about 5 cm from sinus to tip up to 9 cm across, orbicular-cordate to nearly reniform in outline. Raceme simple or with a single branch, up to 40 cm long, lax, with a dense $\pm$ viscid indumentum. Lower bracts tripartite, upper ones entire, lanceolate. Bracteoles oblong-lanceolate, near the flower. Sepals pale purplish with long soft hairs. Helmet 14-16 high, at the base 17-18 mm wide, above 7 mm wide; lateral sepals 12-14, lower deflexed sepals 9-10 mm long. Petals (nectaries) glabrous with an erect claw and a semi-elliptic, obtuse hood. Filaments winged to the middle. Follicles 3, 15 mm, sparsely hairy. Seeds obpyramideate, about 2-3 mm, with crisp, hyaline, transverse lamellae.

Confined to Eastern Kashmir. A rare plant found in rock crevices from 3700-4500 m.

3. *A. heterophyllum* WALL. ex ROYLE, III. Bot. Himal. Mounts. 56. t. 13. 1834; COVENTRY, Wild flow. Kashm. 3:23. 1930., STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 258. 1972.

A. cordatum ROYLE, III. Bot. Himal. Mounts. 56. t. 13, 1834

Biennial, with 2 tubers. Stem (15-) 25-70 (-9) cm high, simple or with a few branches in the lower part, glabrous with a few very short crispate hairs above. Lowermost leaves with long petioles, orbicular-cordate to ovate-cordate in outline, usually deeply 5-lobed with crenate lobes, the others with short petioles or sessile, semiamplexicaulous, irregularly crenate-dentate, rarely lobate. Inflorescence a loose raceme, rarely subpaniculate. Lower bracts similar to upper leaves, the others ovate to lanceolate, crenate or entire. In the longer peduncles the bracteoles one elliptical and usually entire. Sepals blue to violet, glabrous or pubescent, helmet shortly rotate, 18-20 mm high, upto 8-9 mm wide. Lateral sepals obliquely obovate with dark tips, 14-20 x 12-20 mm, not stipitate, lower ones narrower. Petals (nectaries) with a long (16-18 mm) claw and a short (4 mm) very wide hood, which is slightly lobed or entire. Filaments winged to above middle,

6-8 mm long. Carpels 5, oblong-elliptical, crispate-pubescent, abruptly contracted to the style, of about equal length. Follicles straight, 16-18 mm, glabrescent or glabrous. Seeds obpyramidate, 3-4 mm long with almost winged angles.

Distributed from Chitral to Kashmir and Kumaon.

a) var. *heterophyllum*

Bracts entire, Sepals blue to violet, rarely whitish. Follicles glabrescent. Distributed in the whole area of the species.

b) var. *bracteatum* STAPP., Ann. Roy L., Bot. Garden Calcutta 10(2):154. 1905.

Bracts incised-dentate. Sepals blue. Follicles glabrous from the beginning.

Lectotype: Hazara, Kagan, INAYAT 23296 (K).

Distribution from Hazara to Punjab.

4. *A. ovatum* LINDL. Bot. Reg. XXVI, Misc. 53. 1840.

Tubers cylindrical-elongate, upto 4 cm long. Stem upto 75 cm high, terete, unbranched or with a few short branches from the leaf-axils, nearly glabrous below, pubescent crispate above. Lowermost stem-leaves already dry at flowering time. Leaf petiole 3,5 cm, blade cordate-suborbicular; stem leaves with very short petioles of about 5 mm length; middle and upper leaves sessile amplexicaulous, all cordate, crenate, the uppermost excluded deeply, $\pm$ regularly dentate with bi-, rarely tridentate, shortly mucronulate teeth, sparingly hairy, more densely hairy only along the nerves of the lower surface. Bracts similar to the upper leaves, shorter and narrower, or very reduced in size 3-5 x 1 mm. Inflorescence lax, usually short, rarely elongate, lateral racemes (if present) only 1-2-flowered. Pedicels 1-4 cm long, decreasing in size upwards. Sepals yellowish green with purple veins, the lateral ones glabrous, the others softly hairy. Helmet scarcely rostrate, 18-20 x 6-7 mm; lateral sepals 15-17 x 10-11 mm, asymmetrical, nearly acute; lower ones 14-16 x 3-4 mm, oblong-subfalcate. Petals (nectaries) glabrous, claw 12-14 mm, hood obtuse with short deflexed lobes. Filaments 6 mm long, with very few hairs, winged in the lower portion, wings abruptly truncate. Follicles 5, 11-12 mm, free, oblong, at an early stage densely tomentose, later with short hairs, with a distinct style of 2-2,5 mm length.

Seeds oblong-ovate $\pm$ 2,5 mm long, with a few folds, between the folds with a few wartlets.

Distributed from Chitral to Gilgit.

Aconitum ovatum is a very distinct species easily to be recognized by the characters mentioned in the key and only bearing a superficial resemblance to *A. heterophyllum*. NASIR (in RIEDL & NASIR 1961) gives no reasons, why he placed it into synonymy of the latter species. Intermediates are not possible from the nature of the distinguishing characters. Additional differences and a discussion of the status of *A. ovatum* are given by RIEDL (1978).

5. *A. kashmiricum* STAFF ex COVENTRY, Wild Flowers of Kashm. ser. 3: 25. 1930; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 258. 1972.

Biennial with geminate elongate tubers. Stem 12-30 cm high, terete, nearly unbranched or branched, glabrous, crispulate only beneath the inflorescence. Lower leaves with long petioles, orbicular or subreniform, 5-lobed with deeply dentate lobes, wider than long, glabrous or with a few hairs below; middle and upper leaves cordate with a wide basal sinus, rarely suborbicular indistinctly 3-5-lobed, deeply irregularly dentate, the uppermost sessile, amplexicaulous, cordate or oblong-cordate. Bracts similar to uppermost leaves, but much smaller, dentate. Inflorescence very loose, usually with 2-5 flowers on long pedicels. Bracteoles absent or similar to bracts. Sepals blue or violet, glabrous or the margin of helmet ciliate, helmet 10 mm high, 16-18 mm long, upto 10 mm wide, scarcely rostrate, lateral sepals obovate, without stipe 12-3 mm long and wide, lower ones 8-9 mm long, lanceolate-oblong. Petals (nectaries) glabrous, claw 16-17 mm, hood $\pm$ 2,5 mm, narrowly cylindrical, nearly entire. Filaments c. 4 mm, Carpels 4 (-5), densely (woolly) tomentose, hairs spreading, yellowish when dry. Follicles 13-15 mm, straight, not glabrescent. Seeds 2-3 mm long, obpyramidal, without wings.

Distribution in Chitral, Kagan (Hazara) and Kashmir at 2700-3700 m.

NASIR (in RIEDL & NASIR 1991) included *A. kashmiricum* STAFF ex COVENTRY in the synonymy of *A. heterophyllum* var. *bracteatum*. This is hard to understand, as it bears not even a close resemblance to that species. Apart from the small number of flowers, the shape of the leaves is marked-

ly different in the two species. One of the reasons may be that Qureshi & Chaudhri in *Pakistan Systematics* 3(1):6 (1987) described a variety, *A. heterophyllum* var. *parciflorum*, that is obviously identic with *A. kashmiricum*, another, that NASIR never saw any true representative of STAPP'S variety. I did not find any intermediates in the rich collections at Kew or anywhere else. The collections cited by NASIR as few-flowered probably all belong to *A. kashmiricum*.

6. *A. deinorrhizum* HOLMES ex STAPP in *Ann. Bot. Gard. Calcutta* 10 (2): 158. 1905; STEWART, *Ann. Cat. of Vasc. Pl. W. Pak. & Kashm.* 257. 1972;

Biennial, with geminate, $\pm$ elongate tubers. Stem more than 1 m high, terete erect, unbranched, with a few short crispulate hairs in the upper region only. Lower leaves already withered at flowering time, middle and upper ones with 5-7 cm long petioles, reniform to ovate reniform, 5-partite almost to the base, inner segments deeply trifid with a much longer central part that is trifid again in a similar manner, each of the lobes deeply incised-dentate with a few coarse teeth; lateral segments usually bifid with a larger inner lobe, deeply incised, dentate in turn. Inflorescence unbranched or with a few small branches near the base. Lower bracts similar to upper leaves, coarsely dentate, upper bracts much reduced in size. Lower pedicels much longer (up to 6,5 cm) than the upper ones. Bracteoles linear up to 4 mm. Sepals blue, crisp-puberulous. Helmet 15-20 mm high, 17-22 mm long from tip to base, 7 mm wide. Lateral sepals 14-18 mm, obliquely suborbicular, ciliate, lower ones 10 mm, oblong, deflexed. Petals (nectaries) hispidulous, claw $\pm$ straight, 12-13 mm, hood gibbous near the top, with short emarginate lip. Filaments hairy in the upper part, winged beyond the middle. Carpels 3, oblong, appressed greyish-pubescent, with a rather long style. Mature follicles unknown. Seeds obconical, with numerous short transverse lamellae.

According to STEWART (l.c.) the plant has been reported from several places in Bhadarwah Tehsil, E. Kashmir from c. 3400 m by Y. Y. Sarin & Mrs. Gupta (*Bull. Bot. Surv. Ind.* 9 (1-4) 282. 1967). But obviously a rare species.

7. *A. violaceum* JACQUEM. ex STAFF. Ann. Roy. Bot. Gard. Calcutta 10 (2):144. 1905; COVENTRY, Wild Flow. of Kashm. 3:21. 1930; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 259. 1972.

Biennial with geminate tubers. Stem 10-50 cm high usually simple, erect in the lower part, glabrous or hairy. Leaves forming a dense cluster near the base, rarely equally distributed throughout the whole length, with $\pm$ long petioles, orbicular, 5-palmatipartite to the base, primary segments deeply bi-pinnatisect, lobes of the last order linear, acute or subobtus, $\pm$ glabrous, the upper leaves much reduced in size. Inflorescence a dense or $\pm$ lax, simple raceme, rarely with a single branch. Bracts similar to upper leaves, but much reduced. Lower pedicels 4(-5) cm with spreading hairs. Sepals violet, rarely blue or yellowish-green with blue veins, pubescent; helmet 14-20 mm high, 18-24 mm long (including beak); lateral sepals broadly obovate, oblique, 12-16 x 10-14 mm, lower ones elliptical, 10-12 mm, deflexed. Petals (nectaries) glabrous, claw 12-18 mm, hood gibbous dorsally, with truncate recurved lips. Filaments hairy in the upper part, winged in the lower, wings ending in tiny teeth. Carpels 5, densely covered with soft, spreading hairs, turning yellow when dry. Mature follicles 10-12 mm, oblong, truncate, densely hairy. Seeds ellipsoidal or obpyramidal with winged corners.

Distributed in the Western Himalayas, from Hazara to Kashmir and in the Karakorums.

a) var. *violaceum*

Stems slender, only upto 30 cm high, with only two reduced leaves apart from the cluster near the base. Sepals violet or blue.

Occurring in the whole range of the species.

- b) var. *robustum* STAFF., Ann. Roy. Bot. Gard. Calcutta 10 (2): 146. 1905; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 259. 1972.

A. kurramense R.A. QURESHI & M.N. CHAUDHRI, Pak. Syst. 2 (1-2): 6. 1978.

Stems robust, upto 50 mm high, leafy all over, the upper ones distinctly smaller than the lower ones. Sepals violet or blue.

Occurring in the whole area of the species. Of doubtful taxonomic value.

The habit of *A. violaceum* var. *robustum* indeed is similar to that of *A. chasmanthum*. Certainly, however, it is not identical with this species, as

the hairy carpels clearly indicate its relationship to the type variety of *A. violaceum*. NASIR (in RIEDL & NASIR 1991) again changed the status of a generally recognized taxon without careful examination.

c) var. *weileri* (GILLI) H. RIEDL, Willdenowia 8 (2): 325. 1978.

Only one sub-basal leaf developed. Inflorescence lax, 3-4-flowered; sepals green-yellow with blue veins.

Known only from the type-locality in the Karakorum range.

8. *A. chasmanthum* STAPP ex HOLMES, Mus. Report Pharm. Soc. Great Britain 1903: 2. 1903; Coventry, Wildflow. Ser. 3: 19. 1930; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 257. 1972.

Closely related and similar to the preceding species but much shorter, stems 50-120 cm high. Leaves $\pm$ regularly distributed, the upper leaves only slightly smaller than the lower ones. Racemes up to 30 cm long, often with additional slender branches. Pedicels 2,5-3,5 cm (rarely up to 4,5 cm long). Sepals blue or white with blue veins, rarely pale purple, crisp-pubescent to glabrous, lateral ones suborbicular to nearly square, not contiguous with helmet. Claw of petals 5-6 mm. Filaments often almost glabrous, winged, wings not ending in tiny teeth. Carpels straight, glabrous or with a few hairs along the back and near the style. Follicles oblong, 10-16 mm, truncate. Seeds with unequal wings.

Distributed in the Western Himalayas from Swat and Chitral to Kashmir.

a) subsp. *chasmanthum*

Sepals with a few crispate hairs, blue or white with blue veins. Pedicels upto 3,5 cm.

Common on alpine meadows from Chitral to Kashmir from 2300-4300 m. Fl. Aug.

b) subsp. *swatense* (TAMURA) H. RIEDL, Willden. 8 (2): 325. 1978.

A. swatense TAMURA, Acta Phytotax. Geobot. 19: 108. 1963

Sepals pale purple, entirely glabrous. Pedicel upto 4,5 cm.

A southwestern subspecies known only from the type locality. More material is required before its taxonomic status can be confirmed.

9. *A. rotundifolium* KAR. et. KIR. Bull. Soc., Natur. Mosc. 15: 139. 1842; SHTEINBERG in KOM; Fl. URSS. 1937; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 258. 1972.

Biennial, with paired tubers. Stem erect or ascending 10-40 (-60) cm high, terete, glabrous below, crispulate-pubescent above. Single or branched in the upper part. Leaves mostly subbasal, forming rosettes, with long petioles, orbicular truncate or obovate, incised-dentate to laciniate, lobes narrowly linear, subentire, stem leaves lacking or a few, similar to the basal leaves, but smaller and with shorter petiole; uppermost strongly reduced, composed of 2-3 obtuse lobes. Inflorescence few-flowered, lax, short, rarely elongate with a few branches. Lower bracts 3-5-partite, upper ones undivided, linear, entire. Lower pedicels upto 2 cm, upper pedicels shorter. Bracteole absent or very small. Sepals pale or purple-blue or variegated, densely or sparsely pubescent, helmet 12-20 mm high, 15-25 mm long, 4-7 mm wide in the upper part, $\pm$ rostrate; lateral sepals obovate or suborbicular, $\pm$ 15 mm x 10-13 mm; lower sepals deflexed, oblong-elliptical to oblong, upto 8 mm. Petals (nectaries) with a long (12-15 mm) claw, hood narrow, $\pm$ cylindrical, bilabiate at apex. Filaments $\pm$ winged, sparingly hairy. Carpels usually 5, rarely 4 or 6, woolly. Follicles 9-13 mm, softly hairy. Seeds obpyramidal, 2,5-3 mm long, irregularly winged.

Widespread; from Central Asiatic provinces of the USSR (Tien-Shan, Dzungaria) to the Western Himalayas and Chitral. Alt. 3300-5300 m.

10. *A. soongoricum* STAPP. Ann. Roy. Gard. Calcutta 10 (2): 141. 1905; SHTEINBERG, in Kom., Fl. URSS. 7: 232. 1937; STEWART, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 259. 1972

Perennial, rootstock a chain of large conoidal tubers (paired tubers according to STAPP). Stem upto 70 cm high, erect, simple, $\pm$ robust, glabrous or densely pubescent in the upper part. Lower leaves already decayed at flowering time, intermediate leaves loosely scattered, upper leaves more densely arranged; petioles of lower leaves upto 12 cm, of upper leaves 1-2 cm; blade glabrous, cordate-orbicular or reniform. 5-partite to or almost to the base, inner segments rhomboid in outline, 3-lobed, beyond middle or more often pinnatifid, with broadly linear, subobtusely or acute, entire or 1-2-toothed lobes, outer segments deeply bifid with 2-3-lobed inner and an often entire outer lobe. Inflorescence dense or $\pm$ lax, many-flowered, often

with a few additional branches. Lower bracts similar to stem leaves, 3-partite with usually entire segments, uppermost leaves nearly filiform. Pedicels 1-2,5 cm long; bracteoles linear, situated near the flowers. Sepals blue, pubescent, ciliate, helmet with a distinct claw and a long beak, 16-18 mm high, 12-15 mm long from tip to beak, 5-6 mm wide near the top, lateral sepals 13-17 mm long, obliquely obovate-orbicular, lower ones 10-15 mm long, deflexed or subhorizontal, elliptic to oblong. Petals (nectaries) glabrous, claw erect, upto 12 mm, hood gibbous at the back-side near top, lip oblong-obovate crenulate, as long as the hood. Filaments glabrous to sparingly hairy in the upper part; winged in the lower part. Carpels 3, lanceolate-oblong, glabrous. Follicles diverging.

Described from Gilgit.

Distributed in the Central-Asiatic provinces of the USSR (Tien-Shan, Dzungaria) and Gilgit. The descriptions by STAPF and by SHTEINBERG are contradictory as far as the tubers are concerned. While STAPF describes and depicts paired tubers as in the biennial species, SHTEINBERG describes a chain of tubers, which the author could observe himself. Probably, STAPF'S specimens had been collected when flowering for the first time, as all the other characters agree entirely.

11. *A. curvipilum* H. RIEDL, Willdenowia 8 (2): 326. 1978

Perennial, rootstock formed by a chain of conoidal, catenale tubers. Stem 50-60 cm high, unbranched, glabrous or with a few curved hairs, in the uppermost part almost fistulose. Leaves very similar to those of *A. soongoricum* STAPF. Racemes simple or with a single branch, dense or lax, 8-18-flowered. Bracts developed only in the lower part of the inflorescence. Pedicels 5-25 mm long. Bracteoles linear, situated near the flowers. Sepals blue, in life suffused with lilac; helmet 6-8 mm high, 14-18 mm long from the top of the long beak to the base, with a ciliate margin; lateral sepals obliquely orbicular to obovate, 15-16 mm long, 14-15 mm wide, sparingly hairy near the margin; lower ones oblong-lanceolate, $\pm$ obtuse, 14-15 mm long, $\pm$ 5 mm wide, ciliate at margin. Petals (nectaries) with a very long, strongly curved claw, hood 4 mm high, comparatively wide at apex, lips $\pm$ 2 mm long, deflexed. Filaments with long, spreading hairs, in the lower third winged; wings ending in short teeth or truncate.

Carpels 3, covered by short curved hairs on the whole surface, lanceolate. Mature follicles not seen.

Known only from Chitral, where the species had been confused with *A. chasmanthum*. From this species it is different by the same characters as the closely related *A. soongoricum*, which has a much higher helmet, a straight claw of the nectaries, glabrous carpels etc. *A. soongoricum* and *A. curvipilum* differ from *A. chasmanthum* by their catenate tubers, their wide, glabrous leaf-lobes, and the number of carpels, and *A. curvipilum* also by the structure of the stem which is fistulose.

Zusammenfassung

11 Arten und 7 Varietäten von *Aconitum*, die in Pakistan und angrenzenden Gebieten vorkommen, werden aufgeschlüsselt, im Detail beschrieben und mit kritischen Anmerkungen versehen. Der Artikel ist als Richtigestellung des einschlägigen Abschnitts der "Flora von Pakistan" zu verstehen.

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